

Energy drink consumption and its relationship to alcohol use disorders and impulsiveness in health sciences students in Turkey

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Abstract

Purpose: We aimed to examine energy drink (ED) consumption and its relationship to alcohol use disorders and impulsiveness in health sciences students.

Design and Methods: This cross-sectional research was conducted with 1202 health sciences students. Data collection tools were “Energy Drink Consumption Form,” “Alcohol Use Disorders Identification Test (AUDIT),” and “Barratt Impulsiveness Scale-11 (BIS-11).”

Findings: Of the students, 30.6% who used EDs reported doing so in the past year. AUDIT and BIS-11 scores of students with high ED consumption were higher than those with less ED consumption and who do not consume at all ($p < 0.05$).

Practice Implications: Education of students in departments of health should include EDs and their drawbacks as part of nutrition or health coursework.

KEYWORDS

alcohol-related disorders, energy drinks, health sciences students, impulsiveness

1 | INTRODUCTION

Energy drinks (EDs) are highly caffeinated beverages that are marketed to increase energy, endurance, and alertness; and the rates of ED usage are increasing day by day in young people. Between half and two-thirds of all young people had tried caffeinated ED at some point; and nearly one-third report either frequent or heavy use.¹ Reid et al.² stated that the prevalence of ED usage was 86%; 38% were current ED users in the Faculty of Medical Sciences, and Kim and Kim³ stated that 78.1% of nursing students who used EDs reported doing so in the past year. ED consumption has also started to pose a risk for students studying in the department of health.^{2,3}

Although the intended use of ED seems positive (struggling with sleepiness and increasing academic performance and sports), ED consumption in high amounts may affect health negatively.⁴ ED may cause symptoms, such as insomnia, anxiety, nervousness, facial flushing, increase in heart rate, seizure, and stroke.⁴⁻⁶ High rates of ED use and combined use of ED and alcohol may increase the desire to drink and increased the risk of dependence.⁷ Thus, it is

necessary to examine ED consumption and factors associated with consumption, especially in young people whose consumption rates are much higher.¹

Too much ED consumption can cause an increase in the feelings of attention and excessive energy.⁸ This increase in the feelings of attention and excessive energy can cause some behaviors, such as impatience, carelessness, risk-taking, excitement-seeking, pleasure-seeking, extroversion, and lower calculation of possibility of damage that result in extremely risky, immature, unplanned, and mostly undesirable outcomes.^{8,9} These behaviors can be related to impulsiveness.¹⁰

Impulsiveness was defined as the tendency to act quickly and without preplanning without thinking about the consequences.¹¹ It is possible to say that people with high impulsiveness act without thinking or planning adequately compared to others, take action in a way that may create unplanned and undesirable results, and show themselves with features, such as carelessness, impatience, and risk-taking.¹¹⁻¹³ In impulsiveness, the sensitivity to negative consequences that may occur primarily as a result of the behavior is reduced. A rapid and unplanned reaction is created against the stimulus. As a result, long-term results are ignored.^{11,14}

1.1 | The aim of this study

We aimed to examine ED consumption and its relationship to alcohol use disorders and impulsiveness in health sciences students in this study. The research questions are as follows:

- What is the consumption rate of health sciences students?
- What are the ED consumption behaviors of health sciences students?
- Is there a difference between health sciences students' Alcohol Use Disorders Identification Test (AUDIT) scores and their Barratt Impulsiveness Scale-11 (BIS-11) scores by their ED consumption behaviors?

2 | DESIGN AND METHODS

2.1 | Study setting and sample

This study was conducted as a descriptive and cross-sectional study. The sample of the study constituted health sciences students in a university in the Western Black Sea Region of Turkey during the 2018–2019 academic year. A convenience sample was utilized. A representative number of students per department for each institution was determined using student census data in each department. Using lists of classes, the students were recruited from selected classes. The sample comprised 1202 students (participation rate: 75.2%) enrolled in all departments who agreed to participate. The students were informed of the purpose of the study. Criteria for inclusion in the study: being a student in the departments of health, having a mobile phone, and volunteering to participate in the study.

The students' mean age was 20.82 ± 1.96 (17–32); 62.2% were females, 37.8% were males, 25.3% were in the first year, 29.1% were in the second year, 25.9% were in the third year, and 19.7% were fourth-year participants. The distribution of the students based on the departments they were studying was nursing for 33.5%, dentistry for 13.0%, pharmacy for 4.9%, physical therapy and rehabilitation for 16.4%, and medical faculty for 27.9%. In this study, 41.1% of the students had a family monthly income of \$616 and higher, and the mean amount spent on EDs per month was $\$6.55 \pm 21.81$ (\$0–300) (Table 1).

2.2 | Data collection

The researchers went to the relevant department directly in the school to implement the instruments during the research process. Data were collected in a period of 3 months. This time was used to ensure that the data collection tools were filled out as authentically and correctly as possible; the aim of the study was explained to the participants in detail. It took the students about 30 min to fill out the questionnaires. “Energy Drink Consumption Form,” “AUDIT” and “BIS-11,” and “Personal Information Form,” which was prepared by the researchers to reach several characteristics of the participants, were used for collecting data in the study.

TABLE 1 Distribution of some characteristics of the students ($n = 1202$)

Characteristics of the students	$\bar{X} \pm SD$ (lowest score–highest score)	
	<i>n</i>	%
Age	20.82 ± 1.96 (17–32)	
Gender		
Female	748	62.2
Male	454	37.8
Year		
First	304	25.3
Second	350	29.1
Third	311	25.9
Fourth	237	19.7
Department		
Nursing	402	33.5
Medicine	336	27.9
Physical therapy and rehabilitation	197	16.4
Dentistry	157	13.0
Pharmacy	110	9.1
Monthly income of the family		
“3.500 (\$616) and higher	498	41.4
Between “2.000 and “3.500 (\$352–616)	445	37.0
Between “1.500 and “2.000 (\$264–352)	191	15.9
“1.000 (\$176) and lower	67	5.6
	$\bar{X} \pm SD$ (lowest score–highest score)	
Monthly amount spent on energy drinks	$\$6.55 \pm 21.81$ (\$0–300)	

2.2.1 | Personal Information Form

This form was developed by the researchers to identify the socio-demographic characteristics of the students included in the study group. In this form, questions regarding age, sex, department of study, place of residency, monthly income of the family, and monthly amount spent on EDs are included.

2.2.2 | Energy Drink Consumption Form

This form was prepared by the researchers in accordance with literature data to examine the ED consumption behaviors of the students.^{15–17} The form consists of questions asking knowledge of the students regarding ED, the reason for consuming EDs, the amount and frequency of consumption, consumption with alcohol, and the reason, amount, and frequency of consuming ED with alcohol.

2.2.3 | AUDIT

This scale was first developed by the World Health Organization in 1989, and its final version was edited by Babor et al. in 2001. Its adaptation to the Turkish language was performed by Saatcioglu et al.¹⁸ This scale is composed of 10 items for identifying drinking habits, problems regarding alcohol, and alcohol consumption. The total score of the scale is between 0 and 40, and the internal consistency of the scale was found as 0.59 and 0.65 for two different interviewers.¹⁸ The internal consistency of the scale was 0.79 in this study.

2.2.4 | BIS-11

BIS-11 is a self-report scale, including 30 items, which was developed by Barratt to investigate the relationship between anxiety and impulsivity. There were 30 items on the scale scored between 1 and 4 (1 = rarely/never; 2 = occasionally; 3 = frequently; 4 = almost always/always). The higher the total BIS score, the higher the impulsivity level of the individual.¹⁹ Validity and reliability study of the Turkish version of BIS-11 was carried out by Gulec et al.²⁰ For internal consistency of the whole scale, Cronbach alpha coefficients were reported as 0.78 for students.²⁰ The Cronbach alpha coefficient was 0.79 in this study.

2.3 | Data analysis

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS version 22.0). Descriptive data are indicated by number, percentage, mean, and standard deviation. Whether the data was normally distributed was checked with skewness and kurtosis, and parametric tests were used. In comparison to quantitative data, the intergroup differences were examined with a one-way analysis of variance and Student *t*-test. Bonferroni post hoc test was used to determine where the significant difference originated. Results were evaluated within a confidence interval of 95%.

2.4 | Ethical considerations

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by an ethics committee of a university (Date: 04.02.2019, No: 484). Data collection was performed based on the voluntary participation of the individuals enrolled in the study.

TABLE 2 Distribution of the students' behaviors associated with energy drink consumption ($n = 1202$)

Students' behaviors associated with energy drink consumption	<i>n</i>	%
Did you consume energy drinks in the last year?		
Yes	368	30.6
No	832	69.4
Did you consume energy drinks in the last 30 days?		
Yes	142	11.8
No	1058	88.2
How many days did you consume energy drinks in the last 30 days?		
1–6 days	114	9.5
7–13 days	17	1.4
14–24 days	13	1.1
Did you consume energy drinks mixed with alcohol in the last year?		
Yes	209	17.3
No	993	82.7
Did you consume energy drinks mixed with alcohol in the last 30 days?		
Yes	145	11.6
No	1057	88.4
What is the estimated number of cans of energy drinks did you consume in the last 30 days?		
1–9	123	10.2
10–19	15	1.2
20–29	4	0.3
30 and more	3	0.2
How many days did you drink energy drinks mixed with alcohol in the last 30 days?		
1–9 days	50	4.2
10–15 days	12	1.0
What is your reason for preferring to consume energy drinks mixed with alcohol?		
Reducing the sleeping effect of alcohol	10	0.8
Because my friends use	5	0.4
Making party more funnier	35	2.9
To be able to take more alcohol	30	2.5

3 | RESULTS

The distribution of the students' behaviors associated with ED consumption is given in Table 2. Of the students, 30.6% who used ED reported doing so in the past year, 11.8% who used ED reported doing so in the last 30 days, 17.3% who used ED mixed with alcohol reported doing so in the last year, and 11.6% who used ED mixed with alcohol reported doing so in the last 30

days. The reasons to consume ED mixed with alcohol are to make the party funnier (2.9%) and to increase the intake of alcohol (2.5%) (Table 2).

The total score average of the students' AUDIT was 8.84 ± 7.56 , and the highest score among the subdimensions was dangerous alcohol use (3.17 ± 2.43). The total score average of the students' BIS was 60.13 ± 9.10 , and the highest score among the subdimensions was attention impulsiveness 23.46 ± 3.80 (Table 3).

The comparison of students' AUDIT scores, by their behaviors associated with ED consumption, is given in Table 4. AUDIT scores were found to be higher in those who consumed ED in the last year than those who did not ($p < 0.001$). AUDIT scores were found to be higher in those who consume ED in the 30 days than not consume ($t = -6.342$; $p < 0.001$). AUDIT scores were found to be higher in those who consumed ED in the last year than in those who did not in the last year ($p < 0.001$). AUDIT scores were found to be higher in those who consume 30 and more cans of ED than consume 1–9 cans of ED in the last 30 days ($p = 0.006$). AUDIT scores were found to be higher in those who consume 10–19 cans ED than consume 1–9 cans of ED in the last 30 days ($p = .004$). AUDIT scores were found to be higher in those who consumed ED mixed with alcohol for 10–15 days in the last 30 days than in those who consumed ED mixed with alcohol for 1–9 days in the last 30 days ($t = 19.662$; $p < 0.001$). AUDIT scores were found to be higher in those who consumed ED mixed with alcohol to reduce the sleeping effect of alcohol than who consumed ED mixed with alcohol because of his/her friends use ($p < 0.001$) (Table 4).

The comparison of students' BIS scores, by their behaviors associated with ED consumption, is given in Table 4. BIS scores were found to be higher in those who consume ED for 14–24 days than consume ED for 1–6 days in the last 30 days ($p < 0.001$). BIS scores were found to be higher in those who consume 1–9 cans of ED in the last 30 days than in those who consume 30 and more cans of ED in the last 30 days ($p < 0.001$). BIS scores were found to be higher in those who consumed ED mixed with alcohol for 10–15 days in the last 30 days than in those who consumed only ED for 1–6 days in the last 30 days ($t = 27.274$; $p < 0.001$). BIS scores were found to

be higher in those who consume ED mixed alcohol to reduce the sleeping effect of alcohol than because his/her friends use ($p < 0.001$) (Table 4).

4 | DISCUSSION

Our data contribute to the understanding of ED consumption and its relationship to alcohol use disorders and impulsiveness in university students. The prevalence of ED consumption was 30.6%, and the prevalence of ED mixed alcohol consumption was 9.5%. The students mostly reported that they consumed EDs for having fun and being able to take more alcohol. AUDIT and BIS scores of students with high ED consumption were higher ($p < 0.05$).

The prevalence of ED consumption was 30.6%, and the prevalence of ED mixed alcohol consumption was 9.5% in this study. Kulak et al.²¹ reported that 68% of university students consumed ED at least once in their lives, and Reid et al.² reported the prevalence of ED consumption among university students as 86%, and these rates are quite high.

In this study, the students mostly reported that they consumed ED for having fun and being able to take more alcohol. The reasons for consuming ED among young people were getting prepared for physical activity,²¹ decreasing tiredness,^{3,21} enjoying its taste,¹⁵ trying to stay awake and study,²² and being able to drink more alcohol.⁹

In this study, 17.3% of the students consumed ED mixed alcohol in the last year; 11.6% of the students consumed energy mixed alcohol drinks in the last 30 days. Consuming ED by mixing with alcohol has become very popular among teenagers. In some studies, the consumption rate of ED mixed alcohol within the last year was 13.2%²³; and the consumption of EDs mixed with alcohol was 11.6% within the last one month and 9.7% within the last 1 week.²⁴

In this study, AUDIT scores were found to be higher in those who consume ED mixed alcohol for 10–15 days than consume EDs for 1–9 days in the last 30 days ($t = 19.662$; $p < 0.001$). Some of the young people who were drinking ED mixed alcohol stated that they got less drunk and the others thought that ED increased alcohol intoxication. Problematic alcohol use is observed, especially ED mixed alcohol consumption cannot be controlled.^{7,25}

AUDIT scores were found to be higher in those who consume ED mixed alcohol to reduce the sleeping effect of alcohol than because his/her friends use ($p < 0.001$). University students mostly drink EDs to get energy and not sleep to study for exams.²² For this reason, intensive consumption of ED and ED mixed alcohol by university students can result in intensive alcohol intake during the exams period.

BIS scores of students with high ED consumption were higher than those with less ED consumption and do not consume at all ($p < 0.05$). Also, BIS scores were found to be higher in those who consume ED mixed alcohol for 10–15 days than consume EDs for 1–6 days in the last 30 days ($t = 27.274$; $p < 0.001$). There may be a relationship between the consumption of ED mixed alcohol and risky behaviors.¹⁰ Problematic alcohol consumption might predict impulsiveness.²⁶ For example, acute alcohol intoxication generally incited impulsive decision-making.^{27,28} ED mixed alcohol consumption may lead to greater acute tolerance for the willingness to drive versus alcohol alone. As ED mixed alcohol consumers also drink higher doses of alcohol than alcohol consumers, it is likely that both binge drinking.⁹

TABLE 3 Distribution of the students' Alcohol Use Disorders Identification Test and Barratt Impulsiveness Scale scores ($n = 1202$)

Scales and their subdimensions	Mean \pm SD	Lowest score	Highest score
Alcohol Use Disorders Identification Test			
Dangerous alcohol use	3.17 ± 2.43	1	12
Addiction	2.00 ± 2.85	0	12
Harmful alcohol use	2.59 ± 3.71	0	16
Total score	8.84 ± 7.56	1	39
Barratt Impulsiveness Scale-11			
Attention impulsiveness	23.46 ± 3.80	1	29
Motor impulsiveness	20.05 ± 4.10	11	38
Nonplanning impulsiveness	16.61 ± 3.54	13	34
Total score	60.13 ± 9.10	36	97

TABLE 4 Comparison of students Alcohol Use Disorders Identification Test and Barratt Impulsiveness Scale-11 scores, by their energy drinks consumption behaviors ($n = 1202$)

The behaviors associated with energy drinks consumption	Alcohol Use Disorders Identification Test Mean \pm SD	Barratt Impulsiveness Scale-11 Mean \pm SD
Did you consume energy drinks in the last year?		
Yes	9.31 \pm 7.78	64.29 \pm 9.78
No	8.13 \pm 7.18	64.44 \pm 9.33
Significance	$t = -3.707$; $p < 0.001$	$t = -1.610$; $p = 0.107$
Did you consume energy drinks in the last 30 days?		
Yes	13.78 \pm 8.62	64.65 \pm 10.33
No	7.05 \pm 6.26	64.24 \pm 9.33
Significance	$t = -6.342$; $p < 0.001$	$t = -0.896$; $p = 0.370$
How many days did you consume energy drinks in the last 30 days?		
1–6 days	10.76 \pm 5.98 ^a	61.50 \pm 8.39 ^a
7–13 days	21.50 \pm 4.50	76.00 \pm 7.25
14–24 days	26.11 \pm 4.37 ^a	80.11 \pm 3.51 ^a
Significance	$F = 32.335$; $p < 0.001$	$F = 27.860$; $p < 0.001$
Did you consume energy drinks mixed with alcohol in the last year?		
Yes	9.42 \pm 6.78	63.29 \pm 8.74
No	9.13 \pm 6.18	63.44 \pm 7.23
Significance	$t = 1.147$; $p = 0.215$	$t = -2.630$; $p = 0.084$
Did you consume energy drinks mixed with alcohol in the last 30 days?		
Yes	10.31 \pm 5.42	61.89 \pm 8.89
No	9.78 \pm 6.73	62.44 \pm 4.23
Significance	$t = 2.529$; $p = 0.153$	$t = -1.850$; $p = 0.151$
What is the estimated number of cans of energy drinks did you consume in the last 30 days?		
1–9 cans	10.42 \pm 5.90 ^{b,c}	62.30 \pm 8.86 ^c
10–19 cans	25.27 \pm 5.56 ^b	69.63 \pm 11.21
20–29 cans	18.33 \pm 2.30	63.00 \pm 8.66
30 cans and more	25.33 \pm 12.09 ^c	76.66 \pm 5.85 ^c
Significance	$F = 8.499$; $p < 0.001$	$F = 28.227$; $p < 0.001$
How many days did you drink energy drinks mixed with alcohol in the last 30 days?		
1–9 days	10.46 \pm 5.02	59.46 \pm 9.69
10–15 days	21.62 \pm 4.27	70.37 \pm 9.99
Significance	$t = 19.662$; $p < 0.001$	$t = 27.274$; $p < 0.001$
What is your reason for preferring to consume energy drinks mixed with alcohol?		
To reduce sleeping effect of alcohol	23.33 \pm 10.83 ^d	74.88 \pm 11.01 ^e
Because friends use	9.40 \pm 7.60 ^d	70.00 \pm 2.64
To make party more funny	11.35 \pm 5.63	63.20 \pm 7.75

(Continues)

TABLE 4 (Continued)

The behaviors associated with energy drinks consumption	Alcohol Use Disorders Identification Test Mean ± SD	Barratt Impulsiveness Scale-11 Mean ± SD
To be able to take more alcohol	15.75 ± 9.08	59.18 ± 12.58 ^c
Significance	F = 14.030; p = 0.003	F = 10.826; p = 0.013

Abbreviations: F, one-way analysis of variance; t, Student t-test.

^aPost hoc tests revealed significant differences in the scores between the students who consume ED 1–6 days and the students who consume ED 14–24 days in the last 30 days.

^bPost hoc tests revealed significant differences in the scores between the students who consume ED 1–9 cans and the students who consume ED 10–19 cans in the last 30 days.

^cPost hoc tests revealed significant differences in the scores between the students who consume ED 1–9 cans and the students who consume ED 30 cans and more in the last 30 days.

^dPost hoc tests revealed significant differences in the scores between the students who consume ED to reduce the sleeping effect of alcohol and the students who consume ED because him/her friends use.

^ePost hoc tests revealed significant differences in the scores between the students who consume ED to reduce the sleeping effect of alcohol and the students who consume ED to be able to take more alcohol.

4.1 | Limitations

There are two limitations to this study. The first is that the sample consists of the health sciences students at only one university. The results of the study may not be open to generalization. There may be different applications in other schools. The study can be repeated with a larger sample and with multicenter studies. Second, in this study, female participants were more as compared with male participants, which may have affected some results.

5 | CONCLUSION

In conclusion, ED and ED mixed with alcohol consumption rates of health sciences students were high. The students consume ED to have fun and to increase alcohol intake. Another relevant finding of this study is the negative effect of ED consumption on alcohol use. ED consumption increases alcohol intake. In addition, impulsiveness is seen at a higher rate in students with high ED consumption than those with less ED consumption and who do not consume at all. Based on these results, it is important to instruct health science students about the content and consumption of ED and to provide them with training about this topic to prevent them from facing negative effects.

5.1 | Implications for nursing practice

Education of students in departments of health should include ED and ED mixed alcohol and their drawbacks as part of nutrition or health coursework. Therefore, consuming ED and ED mixed alcohol should be considered “high-risk drinking” for students and efforts should be made to discourage combined consumption. Students should be informed about the

content and the side effects of ED. By making sure that students are acquainted with the ingredients and side effects as well as the caffeine and alcohol content of ED, we can prevent future health problems.

Students who have to stay awake and need more energy should pay attention to the caffeine and alcohol ratio they get from ED during exam periods. Evidence-based interventions should be planned for students with high ED consumption. New methods and activities should be developed for students to stay awake and get more energy. In addition, on-campus campaigns focused on decreasing ED consumption is necessary.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

Data available in article supplementary material. Shared data availability only upon request.

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